SCHOOL FACILITIES AND ITS EFFECTS ON ACADEMIC PERFORMANCE IN TECHNICAL DRAWING IN LAGOS STATE SECONDARY SCHOOL

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ABSTRACT

This research work was conducted to examine the school facilities and its effects on academic performance in Technical Drawing. The survey research design was used in carrying out the study since it required the collection of data from a large number of participants within the limited time scheduled for the completion of the project. Relevant research questions and hypotheses were answered and tested respectively to show the findings of the study. A questionnaire was designed by the researcher and validated by the supervisor and it was administered on the participants for the generation of the required data. A total number of 42 participants comprising male and female students were selected through simple random sampling method as the sample for the study. The analysis of the data collected from participants was carried out with the use of percentage and frequency distribution tables, while the hypotheses earlier stated in the study were tested with the t-test ***statistical*** *tool. The following are the findings; Availability of school facilities will have significant effect on students' performance in Technical Drawing. Adequacy of school facilities will have significant effect on students' performance in Technical Drawing Management of School facilities will have significant effect on students' performance in Technical Drawing. Utilization of school facilities will have significant effect on student's performance in Technical Drawing. In line with the findings made from this investigation, the following recommendations were offered by the researcher. Government at all levels should make provision for school facilities for the science students as this will have significant effect on students' performance in Technical Drawing. Adequacy of school facilities should be a priority for every public secondary school as this will influence students' performance in Technical Drawing*

Introduction

Technical Drawing is defined as the study of precise and detailed drawing of an object, as employed in architecture or engineering. It requires the practice or skill of producing working drawings. Technical Drawing is natural science in which individual study living organism's plants and animals. The knowledge of Technical Drawing helps in checking environmental degradation such as desertification, erosion, water hyacinth, land, and air and water pollution. The cardinal objectives of Technical Drawing education are to prepare students to acquire: adequate laboratory and field skills in Technical Drawing; meaningful and relevant knowledge in Technical Drawing, ability to apply scientific knowledge to everyday life in matter of personal and community health and agriculture and lastly reasonable and functional scientific attitudes (Abugu, 2017).

Technical drawing, drafting or drawing, is the act and discipline of composing drawings that visually communicate how something functions or is constructed. Technical drawing is essential for communicating ideas in industry and engineering. To make the drawings easier to understand, people use familiar symbols, perspectives, units of measurement, notation systems, visual styles, and page layout. Together, such conventions constitute a visual language and help to ensure that the drawing is unambiguous and relatively easy to understand. Many of the symbols and principles of technical drawing are codified in an international standard called ISO 128. The need for precise communication in the preparation of a functional document distinguishes technical drawing from the expressive drawing of the visual arts. Artistic drawings are subjectively interpreted; their meanings are multiply determined. Technical drawings are understood to have one intended meaning.

The state of poor performances in Technical Drawing was confirmed by West Africa Examinations Council (WAEC) Chief Examiners' Report in the past five years i.e. 2013, 2014, 2015, 2016, 2017 & 2018 revealed that inability of the students to follow the rules on technical drawing practical and theory such as; improper title, poor labelling, neatness, paper usage, too thick or thin lines among others are responsible for students' poor performance in drawings. Looking into the importance of Technical Drawing, poor performance in the area should be a thing of serious concern to various stakeholders connected with education and national development. Paying attention to improving the knowledge of technical drawings is a rescue

move to prevent poor achievements in Technical Drawing and other fields of studies that their understanding hinged on the knowledge of technical drawings. Technical Drawing instructional resources could be used to diagnose the quality of students' understanding about a concept (Opuh, Eze, & Eze Magu, 2016).

In addition, the state of poor performances in Technical Drawing was confirmed by West Africa Examinations Council (WAEC) that Students' achievement in Technical Drawing in both internal and external examinations was poor. It was also revealed that students' poor knowledge of technical drawings stood out among other factors that are responsible for poor students' achievement in Technical Drawing. A good example of area where student perform poorly in Technical Drawing is cam, interpenetration and loci among others, these drawings are clear representation of workshop specimens. It has to do with presenting a practical activity on paper in form of diagram using pencil. Technical drawing is different from artistic, geographical drawings since there are rules guiding. School facilities are materials designed to serve the purpose of assisting teaching and learning in the school system. They are used; to illustrate concepts; provide opportunity for firsthand experience; for practical's and demonstration; for engineering investigation and discovery; to provide diversity of thoughts; for observation and inquiry; for development of scientific attitudes and skills; to protect the individual and also provide comfort (Asiabaka, 2014).

School facilities refers to resources that can be used to enhance educational programmes and promote teaching and learning. School facilities are classified into: classroom/laboratories and textual material/Audio visual aids. Classroom/laboratories resources is known as a science laboratory and a special facility where experiments are done and typically contains equipment, drawing rooms, drawing materials and other tools necessary to complete drawing activities. An example of a drawing laboratory is a big room in a school that has tables, drawers, drawing boards and Computers ready for drawing activities to be carried out. Drawing laboratories can be found as research room and learning spaces in schools and universities, industry, government, or military facilities, and even aboard ships and spacecraft. Drawing laboratories are used for teaching, learning and expositions of drawing research, this take many forms because of the differing requirements of specialists in the various fields of engineering.

Laboratory equipment refers to the various tools and equipment used by teachers in imparting learning (Akintola & Olagunju, 2018). Audiovisual aids is defined as "training or educational materials directed at both the senses of hearing and the sense of sight, films, recordings,

photographs, etc. used in classroom instructions, library collections or the likes". Audiovisual education or multimedia-based education (MBE) is instruction and comes under science and technology department where particular attention is paid to the audio and visual presentation of the material with the goal of improving comprehension and retention. In this modern world we use digital tools to improve the teaching-learning process. The most common tool used in classroom these days is PowerPoint slides, which makes the class more interesting, dynamic and effective.

Moreover it also helps to introduce new topics in easy way. Availability and utilization of school facilities like audiovisual aids makes the students to remember the concept for longer period of time. They convey the same meaning as words but it gives clear concepts thus help to bring effectiveness in learning. Integrating technology into the classroom help students to experience things virtually or vicariously. Although the first-hand experience is the best way of educative experience but such an experience cannot always be done in practical so in some cases there is need for substitution. Use of audio-visual aids help in maintaining discipline in the class since all the students' attention are focused in learning. This interactive session also develops critical thinking and reasoning that are important components of the teaching-learning process. Audiovisual provides opportunities for effective communication between teacher and students in learning. Students learn when they are motivated and curious about something. Traditional verbal instructions can be boring and painful for students. However, use of audio-visual provides intrinsic motivation to students by peaking their curiosity and stimulating their interests in the subjects (Ajayi & Ogbeba, 2017).

From observation, no effective drawing activities in a technology education programme can exist without the availability of necessary school facilities. This is because facilities enable the teachers and learners to develop problem-solving skills and scientific attitudes. When facilities are provided to meet relative needs of a school system, students will not only have access to the reference materials mentioned by the teacher, but individual students will also learn at their own paces. The net effect of this is increased overall academic performance of the entire students (Veronica & Victor 2019). The level of availability and utilization of school facilities is a correlates of students' academic performance in science related subjects like Technical Drawing among others in Lagos state, since the classroom learning environment in some schools was poor. It is observed that some schools without chalkboard, absence of ceiling, some roofing sheets not in place, windows and doors removed among others, and a situation which the

researcher regarded as hazardous to healthy living of the students. The problem of candidates' mass failure in examinations will continue until the situation of schools in the country change for the better (Ugwuadu, 2017).

Commenting on why academic performance is not in vogue in Nigeria, it was observed that poor and inadequate facilities, obsolete teaching techniques, overcrowded classrooms among others, as factors. School facilities when provided will aid teaching-learning programme and consequently improve academic performance of students. However in many rural and some urban areas of Lagos state and beyond, certain physical facilities are none existent, and that those instances, where amenities are available many are of substandard quality. What is even more alarming is the correlation, which observers claim to exist between quality of facilities and academic performance. Lamenting on the glowing inadequacies of school facilities in our educational industry, and mere looking at some secondary schools, there is abundant evidence of crippling inertia, criminal neglect and a pervasive decay in values and standard (Akintola, Olagunju & Ahmed, 2018). Few examples of school facilities:

Also, absence or poor (and/or deteriorating) quality and lack of utilization of educational facilities can affect academic performance. However, school facilities, teachers' salaries, books in the library and the presence of science laboratory, had little impact on variation in student's achievement once student's background variables had been taken into account. This statement connotes that before such student could perform well in higher educational level, he must have been groomed or cushioned by availability of resources in his elementary days upon which he now uses as spring board. Hence, facilities form one of the potent factors that contribute to academic achievement in the school system. They include the school buildings, classrooms, accommodations, libraries, laboratories, furniture, recreational equipment, apparatus and other instructional materials. The availability, relevance and adequacy contribute to academic achievement. In addition, that unattractive school buildings and overcrowded classrooms among others contribute to poor academic attainment (Ajayi & Ogbeba, 2017).

Statement of Problems

In Nigeria, students' academic performance in secondary school Technical Drawing has not been encouraging. In spite of the desire for advanced school facilities, which need Technical Drawing education there is persistent low enrolment and poor academic achievement of students in the subject, particular in both theory and practical Technical Drawing. So many factors can be attributed to student poor achievement in Technical Drawing practical, they include teachers use

of inappropriate instructional approaches, lack of adequate laboratory facilities, poor organization of laboratory activities, lack of commitment to laboratory work by both teachers and students, partial or total absence of laboratory, lack of qualified Technical Drawing teachers and mode of laboratory activities that are used in Technical Drawing laboratory (Adesina, 2018)

The inappropriate instructional approaches used by secondary school Technical Drawing teachers tend to raise doubts about the possibility of realizing the objectives of Technical Drawing education in Nigeria secondary school as stated in the National Policy on Education (Federal Ministry of Education, 2008). Most instructional approaches such as lecture and demonstration method used in teaching Technical Drawing in the classroom or laboratory, facilitates rote learning and lack of opportunity for students to manipulate materials and reflect on what they do during teaching and learning processes. Student interaction during Technical Drawing activities in the laboratory could play a key role towards concretizing learning (Veronica, Josiah & Victor, 2019). It is against this background that the researcher intend to carry out an in-depth study on school facilities and its effects on academic performance in Technical Drawing.

Research Questions

The study will be guided by following research questions.

1. Will availability of school facilities have any effect on academic performance of students in Technical Drawing in secondary schools .?
2. Will adequate school facilities have effect on student performance in Technical Drawing in secondary school .?
3. Will management of school facilities have effect on student's performance in Technical Drawing in secondary schools .?
4. Will improvisation of school facilities have effect on students' performance in Technical Drawing in secondary schools .?

Research Hypothesis

1. Availability of school facilities will not have significant effect on students' performance in Technical Drawing.
2. Adequacy of school facilities will not have significant effect on students' performance in Technical Drawing

3. Management of School facilities will not have significant effect on students' performance in Technical Drawing.
4. Utilization of school facilities will not have significant effect on student's performance in Technical Drawing.

Methodology

Design

A survey research method was used in carrying out this study the school facilities and its effects on academic performance in Technical Drawing. Survey research design is a research method in which a group of people or items are studied by collecting and analyzing data from only a sample considered to be a representative of the entire population The study adopts survey design method which aimed at identifying variables and their relationships to one another (Azika, 2015.

Population of the study

There are six education district in Lagos state. The target population for this study comprises all the SS 2 students of public secondary schools in offering Technical drawing in Lagos State. A simple random sampling technique was adopted for this study. Lagos State comprises of six Educational District. Educational districts 4 was purposively selected for the study because of its closeness to the researcher, A sample of 80 students was randomly selected from Education district IV, ten SS II students was selected from eight secondary school.

Instrumentation

The major instrument of collecting data in this study was a structured questionnaire. The questionnaire was administered on the selected sample students at the selected schools. The questionnaire was drawn based on the research questions. The questionnaire contains four parts containing (20) twenty items statement on the availability, adequacy, management and improvisation of school facilities for Technical Drawing teaching and learning in senior

secondary schools. The questionnaire is design in line with Likert scale method. The instrument was validated by three experts comprising of two technology education teachers and one experienced technical drawing teacher. A reliability coefficient carried out was found out to be 0.91, this which was considered appropriate for the study.

Method of Data Analysis

The study was analyzed with the use of both descriptive and inferential statistics in analyzing the data. Simple frequency counts, percentages, and t-test was used in the data analysis. The data obtained was analyzed using the descriptive statistics of the statistical package for social science students (SPSS Version 20.0) while the findings was discussed along with literature reviews. Frequency counts and percentages was used to analyze both the demographic data and to examine the different ways by which the students interpret Technical Drawing concepts. Furthermore, t-test statistics was used in testing the hypotheses.

DATA ANALYSIS AND DISCUSSION

Research Question 1:

Will availability of school facilities have any effect on academic performance of students in Technical Drawing in secondary schools.?

Table 1: Mean ratings and standard deviation of Respondents' responses on the availability of school facilities have any effect on academic performance of students in Technical Drawing in secondary schools..

N= 80

S/N	Availability of School Facilities Effect on Academic Performance of Students in Technical Drawing	Mean	Std. Dev.	Remark
1.	Having visual resources such as pictures while studying in class enhances my performance in Technical Drawing.	3.4532	0.5021	Agreed
2.	The use of audio resources like tape recording cassette and teachers voice add value to my retentive memory.	3.4012	0.4921	Agreed

3.	In terms of using electronic resources like e-learning and computer, makes my learning easy and concrete on biological concepts.	3.2745	0.4411	Agreed
4.	Two-dimensional instructional resources such as diagrams and charts makes learning in Technical Drawing to be interesting.	3.4823	0.5011	Disagreed
5.	Non projected media resources which includes books and other printed materials will enhance students learning in Technical Drawing.	3.2665	0.4466	Disagreed

The data presented in table 1 shows the availability of school facilities have effect on academic performance of students in Technical Drawing in secondary schools.. The overall score of (3.19) shows that the availability of school facilities have effect on academic performance of students in Technical Drawing.

Based on the participants' responses on the availability of school facilities have any effect on academic performance of students in Technical Drawing in secondary schools.. A total of 63% strongly agreed is supported by 37% agreed that having access to relevant text books in the school library makes learning simplified while non-disagreed and strongly disagreed with this view. Also, a total of 50% strongly agreed and 35% agreed that having access to audio resources like tape recording cassette and teachers voice in school enhances their academic performance. While 15% disagreed and non-strongly disagreed of the participants. A total of 15% of the participants strongly agreed and supported by 20% agreed from participants that whenever they make use of electronic gadgets like e-learning and computer in the school library makes learning easy and concrete while 45% disagreed and 20% strongly disagreed of the participant. A total of 25% of the participants strongly agreed and supported by 15% agreed from participants that having access to two-dimensional instructional resources such as diagrams and charts aid academic success while 40% disagreed and 20% strongly disagreed of the participant.

Finally, a total of 15% of the participants strongly agreed and supported by 20% agreed from participants that the use of non-projected media resources which includes books and other printed materials aid my study habits while 45% disagreed and 20% strongly disagreed of the participant.

Research Question 2

Will adequate school facilities have effect on student performance in Technical Drawing in secondary school.

Table 2: Mean ratings and standard deviation of Respondents' responses on the adequate school facilities have effect on student performance in Technical Drawing in secondary school

N= 80

S/N	Adequate school facilities and student performance in Technical Drawing in secondary school	**Mean**	**Std. Dev.**	**Remark**
6	I make use of science laboratory equipment to prepare for any Technical Drawing test and exams	2.7522	0.6623	Disagreed
7	Using the laboratory equipment to study abstract concepts in Technical Drawing enhances my performances in class	4.1387	0.4023	Agreed
8	Having access to modern Technical Drawing equipment during practical session enhances my study skills and performances in Technical Drawing	3.6611	0.5998	Disagreed
9	I use Biological apparatus in the laboratory to enhance my practical skills in Technical Drawing.	3.3787	0.4711	Agreed
10	The uses of Biological apparatus help me to be a mastery learner in Technical Drawing practical	4,4923	0.5176	Disagreed
	Overall mean rating on teachers Attitude			

The data presented in table 2 shows the adequate school facilities have effect on student performance in Technical Drawing in secondary school. The overall score of (3.65) shows that the adequate school facilities have effect on student performance in Technical Drawing in secondary schools. A total of 60% of the participants strongly agreed and supported by 40% of agreed that they make use of science laboratory equipment to prepare for any Technical Drawing test and exams while non disagreed. In addition, 70% strongly agreed and 25% agreed that Using the laboratory equipment to study abstract concepts in Technical Drawing enhances my performances in class while 5% strongly disagreed of the participants.

Also, a total of 70% strongly agreed and 25% agreed that Students are skeptical about how they study while 5% disagreed and non strongly disagreed of the participants.

A total of 25% of the participants strongly agreed and supported by 60% agreed from participants that having access to modern Technical Drawing equipment during practical session enhances my study skills and performances in Technical Drawing while the remaining respondent 10% disagree and 5% strongly disagreed with the view.

A total of 90% of the participants strongly agreed and supported by 10% of agreed that I use Biological apparatus in the laboratory to enhance my practical skills in Technical Drawing while no students disagreed and strongly disagreed.

Research Question 3

Will management of school facilities have effect on student's performance in Technical Drawing in secondary schools?

Table 3: Mean ratings and standard deviation of Respondents' responses on the management of school facilities have effect on student's performance in Technical Drawing in secondary schools.

N= 80

S/N	Adequate school facilities and student performance in Technical Drawing in secondary school	**Mean**	**Std. Dev.**	**Remark**
11	Instructional resources bring improvement in the learning process	3.7558	0.6687	Disagreed
12	Instructional resources has really added value to students' academic performance	2.8321	0.4066	Agreed
13	Instructional resources has done little in the area of students' academic performance	3.8878	0.5935	Disagreed
14	Instructional resources aid student's interaction in Technical Drawing performance.	3.3788	0.4776	Agreed
15	Creative use of variety of instructional resources enhance student cognitive skills and intelligent quotient in Technical Drawing	4,4978	0.5155	Disagreed
	Overall mean rating on teachers Attitude			

The data presented in table 3 shows the adequate school facilities have effect on student performance in Technical Drawing in secondary school. The overall score of (3.65) shows that the adequate school facilities have effect on student performance in Technical Drawing in secondary schools

It is reveals that 62% of the participants strongly agreed and support by 20% agreed that Instructional resources bring improvement in the learning process while only 10% disagreed and 8% strongly disagreed with the view. 35% of the participants also agreed and 25% disagreed that Instructional resources has really added value to students' academic performance but 15% of the participants disagreed and 25% strongly disagreed. A total of 50% of the participants strongly agreed and 25% agreed that Instructional resources has done little in the area of students' academic performance while 10% of the participants disagree and 15% strongly disagreed with this statement. Also, a total of 45% of the participants strongly agreed and 35% agreed that Instructional resources aid student's interaction in Technical Drawing performance while 13% disagreed and 7% strongly disagreed with this assertion.

Research question 4

Will improvisation of school facilities have effect on students' performance in Technical Drawing in secondary schools?

Table 4: Mean ratings and standard deviation of Respondents' responses on the Will improvisation of school facilities have effect on students' performance in Technical Drawing in secondary schools .s

S/N	Adequate school facilities and student performance in Technical Drawing in secondary school	**Mean**	**Std. Dev.**	**Remark**
16	Students mishandling instructional resources prevent them from adopting appropriate performance	3.7588	0.6626	Disagreed
17	Students having negative attitude for instructional resources for learning affect their performance	2.8314	0.4044	Agreed
18	Non replacement of damaged instructional resources for students usage denied them of academic performance	3.8853	0.5915	Disagreed
19	Students motives for learning is reduced when instructional resources is outdated	3.3723	0.4711	Agreed
20	Lack of fund to produce instructional resources often hamper their use in teaching and learning	4,4912	0.5133	Disagreed
	Overall mean rating on teachers Attitude			

The data presented in table 4 shows the adequate school facilities have effect on student performance in Technical Drawing in secondary school.. The overall score of (3.65) shows that

the adequate school facilities have effect on student performance in Technical Drawing in secondary school**.** Finally, 20% of the participants strongly agreed and support by 25% agreed that Students mishandling instructional resources prevent them from adopting appropriate performance while only 40% disagreed and 25% strongly disagreed with the view. 30% of the participants also agreed and 45% disagreed that Non replacement of damaged instructional resources for students' usage denied them of academic performance but 15% of the participants disagreed and 25% strongly disagreed.

A total of 40% of the participants strongly agreed and 35% agreed that Students motives for learning is reduced when instructional resources is outdated5while 10% of the participants disagree and 15% strongly disagreed with this statement. Also, a total of 30% of the participants strongly agreed and 40% agreed that Lack of fund to produce instructional resources often hamper their use in teaching and learning while 10% disagreed and 7% strongly disagreed with this assertion.

Findings

1. Availability of school facilities will have significant effect on students' performance in Technical Drawing.
2. Adequacy of school facilities will have significant effect on students' performance in Technical Drawing
3. Management of School facilities will have significant effect on students' performance in Technical Drawing.
4. Utilization of school facilities will have significant effect on student's performance in Technical Drawing.

Conclusion

This study established after a critical examination on the school facilities and its effects on academic performance in Technical Drawing. Observation and analysis of students' achievement in SSCE in the past few years have shown that the level of students' academic achievement in Technical Drawing over the years was not encouraging. Also reports from examining bodies revealed that the number students who got distinctions in Economics WASSCE are low. However, because of the nature of Technical Drawing as the most important social subject, one

would expect majority of the students to have distinctions and credit passes in the subject. Based on this fact, it is concluded that Availability of school facilities will have significant effect on students' performance in Technical Drawing. Adequacy of school facilities will have significant effect on students' performance in Technical Drawing Management of School facilities will have significant effect on students' performance in Technical Drawing. Utilization of school facilities will have significant effect on student's performance in Technical Drawing.

Recommendations

In line with the findings made from this investigation, the following recommendations were offered by the researcher.

- Government at all levels should make provision for school facilities for the science students as this will have significant effect on students' performance in Technical Drawing.
- Adequacy of school facilities should be a priority for every public secondary school as this will influence students' performance in Technical Drawing
- Every public school should have a maintenance culture on every School facilities I order to enhance students' performance in Technical Drawing.
- Every teaching staff and student should be encouraged to utilized school facilities as this will enhance student's performance in Technical Drawing.

REFERENCES

Abugu, O. (2017). A critical appraisal of the role of laboratory practical work in science teaching in Nigeria". *Journal of Curriculum and Instruction, 4 (1&2), pp.59-65.*

Ajayi, U. & Ogbeba, S. (2017). Effective instructional materials in teaching of Technical Drawing Education Today 5 (1 & 2), 51-5

Akintola, D. A. Olagunju, A. M., & Ahmed, A. M. (2018). Assessment of knowledge of biological drawings possessed by students based on teachers' gender and teaching experience in Nigeria. *Educational journal 2(1) 12-1.*

Asiabaka, D. (2014). Mass Failure in Public Examinations (edited) (causes and problems); Proceedings of the National Conference on Mass Failure in Public Examinations 21st-25th April

Opuh, E, & Eze, M. A. (2016). Adequacy of laboratory and laboratory equipment in Edo central senatorial district of Edo State. *Journal of Faculty of Education 14* (1), 54-63.

Ugwuadu, O. R, (2017) Peers and students' assessments of Technical Drawing teacher effectiveness in secondary schools in Adamawa State. *International Journal of innovative social & science education research 5(2):16-24.*

Veronica E., Josiah O., & Victor, O A. (2019) Students' achievement in basic science in basic education certificate examination as a predictor of their performance in Technical Drawing in senior secondary certificate examination. *A discourse on educational issues,* 281-295